

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (currently amended): A method for modifying a refractive index of an optical wave-guide device having a core section doped with  $\text{GeO}_2$  and a clad section, said method comprising the steps of:

condensing ultra short pulse laser rays having a pulse width not more than 30 pico-seconds using an objective lens,

irradiating to at least one of the core section and the clad section, and

saturating the change of the refractive index of the core section;

wherein the ultra short pulse laser rays are irradiated, while scanned along the core section at least one time, to the core section of the optical wave-guide to modify and saturate the refractive index thereof;

wherein the laser rays are irradiated to the core section for heating the core section as well as for modifying the refractive index of the core section so that the color center which is unstable in heat, is removed by the heat generated by the irradiation of the laser rays based on a structural change of the core section, thereby making thermal treatment unnecessary.

2. (original): The method as defined in claims 1, wherein the ultra short pulse laser rays have photon energy lower than half of band-gap energy of a material of the clad section.

Claims 3-5 (canceled).

6. (original) The method as defined in claim 1, wherein the core section includes a plurality of stacked layers or a three-dimensional structure, and the ultra short pulse laser rays are irradiated to the bottom part of the core section to modify the refractive index thereof without changing the refractive index of the top part of the core section.

7. (original) The method as defined in claim 1, whereby the refractive index of the irradiated part is elevated by increasing a density of the irradiated part.

8. (original) The method as defined in claim 1, wherein the refractive index of the irradiated part is reduced by decreasing a density of the irradiated part or producing holes therein.

Claim 9. (canceled).

10. (previously presented): The method as defined in claim 1, wherein the laser rays having a power density for saturating the change of the refractive index of the core section are irradiated.

Claims 11 and 12. (canceled).

13. (original) The method as defined in claim 1, wherein the shape of the core section transmitting the rays is changed to have a taper.

14. (previously presented): The method as defined in claim 1, wherein the core section includes a grating for diffracting rays transmitted in the core section to any direction.

15. (previously presented): The method as defined in claim 1, wherein the core section for guiding the rays and doped with GeO<sub>2</sub> in the optical wave-guide device includes a planar slab wave-guide which is subjected to the refractive index modification.

16. (previously presented): The method as defined in claim 1, wherein the core section of at least one optical wave-guide and a section of coupling rays of a coupler is subjected to the refractive index modification.

17. (previously presented): The method as defined in claim 1, wherein the optical wave-guide device includes an array wave guide grating for dividing multiplexed rays used for WDM optical telecommunication and binding the divided rays, and the refractive index is modified such that a ray having a specified wavelength is coupled to the optical wave-guide.

18. (original) The method as defined in claim 1, wherein the optical wave-guide device includes a fiber grating for diffracting a ray having a specified wavelength and the refractive index of the grating is modified by the specified wavelength.

Claims 19-26. (canceled).